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DAVID E. JANSSEN
Chief Administrative Officer

April 8, 2005

To: Supervisor Gloria Molina, Chair
Supervisor Yvonne B. Burke
Supervisor Zev Yaroslavsky
Supervisor Don Knabe
Supervisor Michael D. Antonovich

From: David E. Janssen
Chief Administrative Officer

BROWNFIELDS ASSESSMENT AND REMEDIATION POLICY

Attached for your review is the final draft of the Brownfields Property Utilization Policy (Policy) that has been developed pursuant to your Board's order of August 5, 2003, to facilitate the redevelopment of County-owned brownfields and/or delivery of County capital improvement projects.

As directed by your Board, the attached Brownfields Policy establishes a risk-based assessment process that will streamline and accelerate the testing and review of County-owned brownfield sites. The Policy is based upon contaminant screening levels that have been developed with the cooperation and assistance of the County Departments of Parks and Recreation (DPR), Public Works (DPW), Health Services (DHS), County Counsel, Community Development Commission (CDC), and the Fire Protection District (FPD), as well as the State Regional Water Quality Control Board (RWQCB) and Department of Toxic Substances Control (DTSC). The recommended screening levels, which are provided in Appendix A to the Policy, are also consistent with the California Human Health Screening Levels that were established by the California Environmental Protection Agency (Cal EPA) in January 2005.

The Policy and the screening levels will provide a framework that will significantly reduce inefficiencies in the assessment process by providing a guideline for determining if contaminant levels are within those deemed to be acceptable by the local regulatory oversight agencies (Cal EPA, DTSC, and RWQCB), or if further assessment is required. It will not diminish the authority of the regulatory oversight agencies and all assessment results will continue to be transmitted to the regulatory oversight agencies.

Site assessments will be conducted prior to the initiation of appraisal activities in the case of an acquisition, or design activities for a capital improvement project. If assessment results are within the screening levels and no other unique requirements have been identified by the regulatory oversight agencies, design and/or appraisal activities will be allowed to proceed. The screening levels will be updated annually in order to accommodate recent research and newly identified contaminants.

Specific assessment procedures and protocols will be included in a Brownfields Guidance Manual that will be developed by my office, DPW, DHS, FPD, and the local regulatory oversight agencies. It is anticipated that a year will be required to develop the Guidance Manual and gain the approval of your Board and the other jurisdictional agencies.

Until the Guidance Manual is fully approved, it is recommended that the Policy and screening levels serve as the basis for site assessments on proposed County land acquisitions and capital improvements, in consultation with the regulatory oversight agencies. This will allow the basic framework envisioned under the Policy to be implemented pending finalization of more specific procedures and protocols in the Guidance Manual.

We are planning to present the Policy and screening levels for consideration by your Board on May 10, 2005. Please let me know if you have any questions regarding the attached package, or your staff may contact Jan Takata at (213) 974-1360 or Dawn McDivitt at (213) 974-2620.

DEJ:JSE
DJT:mdc

Attachments

c: Executive Officer, Board of Supervisors
County Counsel
Consolidated Fire Protection District
Department of Public Works
Department of Health Services
Department of Parks and Recreation
Community Development Commission
California Department of Toxic Substances Control
California Regional Water Quality Control Board
California Environmental Protection Agency

COUNTY OF LOS ANGELES
BOARD OF SUPERVISORS
BROWNFIELDS PROPERTY UTILIZATION POLICY

Policy #:	Title:	Effective Date:
X[1]	Brownfields Property Utilization and Risk-Based Screening Levels	05/01/05

PURPOSE

The purpose of this Brownfields Property Utilization Policy (Policy) is to facilitate the redevelopment of County-owned brownfields, promote in-fill development and the revitalization of sites and adjacent communities, and conserve open space. Application of this Policy and the associated Risk-Based Screening Levels (Screening Levels) will provide a consistent assessment and remediation process that will expedite the implementation of County capital improvement and refurbishment projects, while safeguarding the public's health. The Policy is consistent with:

- the environmental review process required pursuant to the California Environmental Quality Act (CEQA), including specifying the type of substantial evidence that should normally be used in the assessment of a project's potential to result in significant impacts.

- guidance provided under the California Land Environmental Restoration and Reuse Act of 2001 that was established by Senate Bill 32 (Escutia) to facilitate the efficient assessment and remediation of brownfields through the use of Screening Levels, consistent with standards and practices generally utilized by federal and state regulatory agencies.

This Policy will be applied to the evaluation of projects directly undertaken by the County, and projects that are supported by the County through contracts, grants, subsidies, or other assistance. The Screening Levels that serve as the basis for the assessment process, reflect the standards and practices of the local regulatory oversight agencies: the State Regional Water Quality Control Board (RWQCB); State Department of Toxic Substances Control (DTSC); County of Los Angeles Department of Public Works, Environmental Programs Division; and County of Los Angeles Fire Department, Site Mitigation Unit. The Screening Levels will be used as a guideline in determining if the contaminant levels at a site are within those found to be acceptable by the local regulatory oversight agencies; or present a potential risk to human health or property, and thus, require further coordination with the appropriate regulatory oversight agency.

Upon the completion of the assessment process, the Policy requires remediation and mitigation measures that are appropriate for the proposed land use, and establishes a program to ensure the implementation of specified measures, as adopted or approved by the County. The Policy also requires the development of a Brownfields Guidance Manual which provides specific procedures for the implementation of the Policy. The recommended approach will provide for the expedient, efficient, and effective evaluation and remediation of brownfields sites and ultimately facilitate development.

REFERENCES

This section identifies the enabling Board Order, and related documents, memos, or letters that are relevant to the implementation of the Board Order.

- California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Hazardous Waste Toxicology. February 2001. *Practices, Needs, and Methodologies for Human Resource Exposure Assessment at Cal/EPA: Report of the MMRA Project Team, Final Interim Report.*

- California Environmental Protection Agency, January 2005. *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties.*

- City of Oakland Public Works Agency. 1 January 2000. Oakland Urban Land Redevelopment Program.

- County of Los Angeles Board of Supervisors. 25 August 2003. Motion of the County Board of Supervisors to Develop a Brownfields Policy and Risk-Based Screening Levels.

- County of Los Angeles Department of Public Works, Mapping and Property Management Division. 2 November 1993. "Compliance with CERCLA Requirements, Acquisition and Disposition of Rights of Way."

- County of San Diego Department of Environmental Health, Land and Water Quality Division. 10 February 2004. *County of San Diego Site Assessment and Mitigation (SAM) Manual.*

- State of California. 1990. Assembly Bill No. 3193, Chapter 1113: "Polanco Act."

- State of California. 12 October 2001. Senate Bill No. 32 (Escutia): "California Land Environmental Restoration and Reuse Act."

- State of California. 23 September 2004. Assembly Bill No. 389 (Montanez): "California Hazardous Materials: Brownfields."

BACKGROUND

A. California is one of only two states in the nation that does not have a statewide brownfields policy. Brownfields are abandoned, idled, or underutilized properties where development expansion or reutilization is complicated by the real or perceived presence of hazardous materials.

B. Over the past 20 years, the greater Los Angeles area has experienced a sharp decline in its manufacturing and industrial base due to the relocation of businesses outside the region. Based on fourth-quarter data from the County Industrial Review for 2003, approximately 4.4 percent of the County's commercial and industrial lands are vacant or underutilized. The result is that urban areas are rife with brownfields. Where left unresolved, brownfields can create potential health and safety risks for residents.

C. Major environmental concerns relating to brownfields include the exposure of humans to health risks and hazards from groundwater and soil contamination and the related need for environmental justice. Common contaminants found at brownfields sites include lead, asbestos, cyanide, arsenic, cadmium, cobalt, copper, iron, manganese, zinc, volatile organic compounds (VOCs), polyaromatic hydrocarbons (PAHs), pesticides, polychlorinated biphenyls (PCBs), and new emerging chemicals. Each of these contaminants has severe health implications for humans.

D. Proactive identification, analysis, and remediation of brownfields have been proven to create opportunities for redevelopment and revitalization. Other communities in California, most notably the County of San Diego, the City of Oakland, and the City of Emeryville, have successfully encouraged residential and commercial redevelopment of brownfields through the establishment of guidelines that allow the investigation and remediation of brownfields to be completed in the most timely and cost-effective manner possible.

E. The redevelopment of brownfields also relieves the pressure to convert undeveloped land. By one estimate, 1 acre of redeveloped brownfields facilitates the conservation of as much as 4.5 acres of open space.

F. The California Land Environmental Restoration and Reuse Act of 2001, enacted pursuant to Senate Bill 32 (Escutia), allows the establishment of recommended Screening Levels for specified contaminants that are consistent with those utilized by federal and State regulatory oversight agencies as a means to facilitate the efficient and effective assessment and remediation of brownfields sites.

G. The California Land Reuse and Revitalization Act of 2004, enacted pursuant to Assembly Bill 389 (Montanez), allows an innocent landowner, a bona fide purchaser, or a contiguous property owner to qualify for immunity from liability related to pollution caused by a release, or threatened release of a hazardous material on, under, or adjacent to that property, if certain conditions are satisfied.

H. The population of Los Angeles County was estimated at 10,103,000 in 2004 and is expected to increase by an additional three million people between 2005 and 2020. The County will inevitably need to clean and redevelop contaminated, County-owned properties to accommodate the County operations and facilities that will be needed to support the expanding population.

POLICIES

A. General

1. The County encourages the redevelopment of County-owned brownfields property to protect the public's health and accommodate County operations and other productive uses, including industrial, commercial, manufacturing, residential, and open space.

2. The County shall develop Screening Levels for the contaminants specified by the California EPA pursuant to the California Land Reuse and Revitalization Act. Such Screening Levels will:

   - be consistent with the California Human Health Screening Levels (CHHSLs) that have been developed by the California EPA for 54 hazardous substances that are typically found at brownfields sites;

   - provide a guideline for the characterization of contaminant concentrations at a site and the determination of the potential risk to human health or property;

   - provide the basis for an estimate of anticipated cleanup costs that will be developed as part of an assessment of the feasibility of proposed County projects, including land acquisition, capital improvements, and the acceptance of properties from third parties (See Appendix A, *County of Los Angeles Brownfields Program Target Concentrations*).

3. The Chief Administrative Office shall coordinate the preparation of a Brownfields Guidance Manual to assist County departments and the County's consultants, in the identification and evaluation of brownfields properties. The Brownfields Guidance Manual shall:

   - reflect the specific attributes and needs of the County, including the consideration of adjacent properties, and other known or potential sources of contamination;

   - provide an explanation of procedures and cleanup standards specified in California EPA's "Site Investigation and Remediation Processes";

   - articulate the County's recommended site investigation standards and requirements; and

- establish protocols that facilitate communication between the County and regulatory communities and expedite environmental investigation and remediation.

4. Wherever appropriate, the County shall avail itself of immunity from the requirements of state or local regulatory oversight agencies to do further investigation or cleanup work on properties that have been remediated in accordance with the provisions of an environmental oversight process established pursuant to the California Land Reuse and Revitalization Act.

B. Site Investigation Standards

The Brownfields Guidance Manual shall establish Site Investigation Standards that shall be updated on an annual basis by the County Brownfields Task Force and technical consultants, under the supervision of the Chief Administrative Office.

The County's requirements for site investigations shall be consistent with, at a minimum, the latest revision of the American Society for Testing and Materials (ASTM) Standard E 1527, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process," including significant pending updates to the ASTM Standard E 1527 based on new federal legislation and the U.S. EPA proposed due diligence standard regarding "all appropriate inquiry."

The County's requirements for Phase II ESAs shall be consistent with the appropriate ASTM procedures and methods detailed in the most updated version of the following publications and standards:

- ASTM Standards Relating to Environmental Site Characterization
- ASTM Standards Related to the Phase II Environmental Site Assessment Process
- ASTM Standard E 1984, "Standard Guide to the Process of Sustainable Brownfields Redevelopment"

The principal steps in the Phase II ESA process shall include site assessment, risk determination, assessment of remedial action, and risk communication. The objective of the site assessment is to collect information necessary to identify and determine the potential opportunities for exposure of humans, property, and the environment to contaminants of concern. The collection of this data is necessary to make a determination of the potential environmental condition of the property and the appropriate remedial action, if necessary. The resultant information regarding the environmental status of the property shall be made available to citizen groups, community organizations, property owners/operators, developers, and federal, state, and local government officials.

The Brownfields Guidance Manual shall incorporate the processes that should normally be used for evaluating brownfields properties and facilitating productive utilization of abandoned or underutilized properties. At a minimum, the County's Brownfields Guidance Manual shall incorporate the explanation of procedures

provided in California EPA's "Site Investigation and Remediation Processes" and clearly articulate the County's recommended site investigation standards and qualifications.

C. Qualifications for Site Assessment Preparation and Review

The County shall require individuals serving as primary author or reviewer of Environmental Site Assessments (ESAs) to meet the following qualifications.

Preparation and Review of Phase I Reports

The individual must be an environmental professional who possesses the necessary specific education, training, and experience to exercise professional judgment in developing opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property. An environmental professional may be an individual who possesses the following combinations of education and experience:

- Has the relevant qualifications specified by regulatory oversight agencies; and
- Has attained, at a minimum, the designation of registered environmental assessor (REA) I, and/or has attained the appropriate professional license in the area of expertise or relevant experience consistent with the specifications of the County's Brownfields Guidance Manual.

Preparation and Review of Phase II Reports

- Has the qualifications required for the preparation of a Phase I ESA; and
- Has attained, at a minimum, the designation of REA II, or holds a current professional engineer's or professional geologist's license or registration from the State of California or relevant experience consistent with the specifications of the County's Brownfields Guidance Manual.

Use of Registered Professionals

Professional services subject to statutory restrictions, including but not limited to engineering, land surveying, forestry, geology, hydrogeology, and geophysics, shall be provided only by individuals who have been registered and have maintained a current registration with a registration board established under California law.

D. Site Remediation Standards

It shall be the practice of the County to remediate brownfields properties in a manner that is consistent with the standard practices of RWQCB and DTSC. Toward this end, the County shall establish Screening Levels for the contaminants specified by the

California EPA pursuant to the California Land Reuse and Revitalization Act based on the protection of public health and safety. These Screening Levels shall be:

- consistent with the standards that have been routinely used by RWQCB and DTSC for voluntary cleanup programs.

- utilized as a guideline in determining whether consideration of human health or hazards require further analysis and coordination with regulatory oversight agencies.

- used by the County to estimate the degree of effort, remedial technique(s), and financial resources that may be necessary early in the planning process to adequately remediate a contaminated property for its intended future use.

- applied in accordance with the explanations in the guidance document prepared by the California EPA with regard to remediating contaminated properties, facilitating the restoration and revitalization of contaminated property, and making specified decisions.

The Screening Levels established by the County shall serve as the basis for the determination that no further action is required. The County shall establish the cleanup level for a contaminant pursuant to the requirements and procedures of the applicable laws and regulations that govern the remediation of contaminated property. The required site-specific cleanup level may be higher or lower than the established Screening Levels.

E. Compliance with the California Environmental Quality Act

Consistent with the provisions of Section 15300.2, "Exceptions of the State CEQA Guidelines," the County shall ensure that Categorical Exemptions for County projects are used only for sites that are not included on any list compiled pursuant to Section 65962.5 of the California Government Code.

It shall be the policy of the County to require the provision of a Phase I ESA or comparable substantial evidence for County projects involving ground-disturbing activities or conversion in land use prior to determining an application for permit to be complete pursuant to Section 15060, "Preliminary Review of the State CEQA Guidelines."

The preparation of a Negative Declaration for County projects shall be authorized when there is substantial evidence to support the conclusion that the project would not expose people or property to concentrations of contaminants in excess of the County's Screening Levels.

The preparation of a Mitigated Negative Declaration shall be required for a County project involving exposure of people or property to concentrations of contaminants in excess of the County's risk-based screening levels, where the recommendations of a Phase II investigation demonstrate that it is feasible in light of social, economic,

engineering, and environmental considerations to reduce the potential for exposure to below Screening Levels, and where the recommendations are required as mitigation measures or conditions of approval that have been subject to review by the appropriate regulatory oversight agencies.

The preparation of an Environmental Impact Report shall be required for County projects involving exposure of people or property to concentrations of contaminants in excess of County Screening Levels, where there are insufficient data available during the preparation of the Initial Study to make definitive conclusions regarding the feasibility of remediating exposure of people and property to below an acceptable level of risk.

The County's "Environmental Document Reporting Procedures and Guidelines" shall be amended in accordance with this Policy.

RESPONSIBLE DEPARTMENTS

This is a listing of agencies and departments to be included in the policy implementation on a regular basis; however, other agencies and departments may become involved on an as-needed basis in the course of policy implementation at a wide diversity of sites throughout the County.

CHIEF ADMINISTRATIVE OFFICE: Oversee implementation of the Policy, including management of interagency coordination of the Brownfields Guidance Manual, annual updates to the Brownfields Guidance Manual, coordination with Board Offices regarding identification and evaluation of opportunities to redevelop County brownfields properties to productive uses, and preparation of brownfields site grants.

DEPARTMENT OF PUBLIC WORKS: Serve as the agency responsible for reviewing Phase I and Phase II ESAs prepared in support of County projects; maintain site-specific databases of underground storage tank locations and solid waste disposal facilities, remedial activities, and site closure status; and provide technical expertise to support preparation and annual update of the Brownfields Guidance Manual.

FIRE DEPARTMENT: Provide information on possible brownfields sites, such as data on hazardous materials storage, spills, and other emergencies, and any environmental site investigation records. The Health Hazardous Materials Division is designated as the Certified Unified Program Agency (CUPA) for the County.

COMMUNITY DEVELOPMENT COMMISSION: Provide information on possible brownfields sites and on financial and other incentives for potential brownfields redevelopers within the designated County Redevelopment Areas and other properties within the Redevelopment Survey Areas.

OFFICE OF THE COUNTY COUNSEL: Provide legal oversight and advice concerning brownfields properties.

DEPARTMENT OF PARKS AND RECREATION: Identify potential brownfields sites and assist with redeveloping certain brownfields sites for park, recreation, and open space uses.

DEPARTMENT OF HEALTH SERVICES: Assist in information sharing and reporting of environmental conditions at brownfields sites that may pose a threat to human health, provide information on human health effects related to brownfields contaminants and/or cleanup and redevelopment processes, and serve as the County's center of expertise for the review and preparation of Health Risk Assessments to support environmental documents prepared pursuant to CEQA for County projects.

DATE ISSUED/SUNSET DATE

Issue Date: April 2005 **Sunset Review Date: June 30, 2006**

Appendix A

Los Angeles County Brownfields Program Target Concentrations

The following provides risk-based concentrations (RBC) to be used in evaluating the environmental status of brownfield sites in Los Angeles County. A RBC is the soil or groundwater concentration of a chemical that is not expected to cause adverse health effects under defined exposure conditions. RBCs were developed for the 56 chemicals identified in SB32. The following sources provided toxicity values and exposure assumptions:

OEHHA (2004)
IRIS (2004)
HEAST (2004)
NCEA (2004)
EPA Region 9 (2004)
EPA (1994)

The sources for toxicity values were: IRIS, HEAST, NCEA, OEHHA. Toxicity values were selected from IRIS first, but if not available on IRIS, toxicity values were selected from HEAST, and so on. OEHHA toxicity values were used if values were not available from IRIS, HEAST, or NCEA.

Under guidelines discussed in EPA (2002), reference concentrations were converted to inhalation reference doses using the following equation:

$$RfDi\ (mg/kg\text{-}day) = RfC\ (mg/m^3) \times 20\ (m^3/day) \times (1/70\ kg)$$

Where:

RfDi	=	inhalation reference dose
RfC	=	reference concentration

Under guidelines discussed in EPA (2002), unit risk factors were converted to inhalation slope factors using the following equation:

$$SFi\ (kg\text{-}day/mg) = URF\ (m^3/ug) \times day/20\ m^3 \times 70\ kg \times 10^3\ ug/mg$$

Where:

SFi	=	inhalation slope factor
URF	=	unit risk factor

Under guidelines discussed in EPA (2002), the following equations were used to develop RBCs for soil. The soil equations are based on three exposure routes (ingestion, dermal contact, and inhalation of volatile organic chemicals).

RBC for Combined Exposure to Carcinogenic Contaminants in Residential Soil

$$C(mg/kg) = \frac{TR \cdot AT_c}{EF_r\left[\left(\frac{IFS_{adj} \cdot CSF_o}{10^6 mg/kg}\right) + \left(\frac{SFS_{adj} \cdot ABS \cdot CSF_o}{10^6 mg/kg}\right) + \left(\frac{InhF_{adj} \cdot \cancel{CSF_i}}{VF_s}\right)\right]}$$

RBC for Combined Exposure to Noncarcinogenic Contaminants in Residential Soil

$$C(mg/kg) = \frac{THQ \cdot BW_c \cdot AT_n}{EF_r \cdot ED_c\left[\left(\frac{1}{RfD_o} \cdot \frac{IRS_c}{10^6 mg/kg}\right) + \left(\frac{1}{RfD_o} \cdot \frac{SA_c xAFxABS}{10^6 mg/kg}\right) + \left(\frac{1}{RfD_i} \cdot \frac{IRA_c}{VF_s}\right)\right]}$$

RBC for Combined Exposure to Carcinogenic Contaminants in Industrial Soil

$$C(mg/kg) = \frac{TR \cdot BW_a \cdot AT_c}{EF_o \cdot ED_o\left[\left(\frac{IRS_o \cdot CSF_o}{10^6 mg/kg}\right) + \left(\frac{SA_a \cdot AF \cdot ABS \cdot CSF_o}{10^6 mg/kg}\right) + \left(\frac{IRA_a \cdot CSF_i}{VF_s}\right)\right]}$$

RBC for Combined Exposure to Noncarcinogenic Contaminants in Industrial Soil

$$C(mg/kg) = \frac{THQ \cdot BW_a \cdot AT_c}{EF_o \cdot ED_o\left[\left(\frac{1}{RfD_o} \cdot \frac{IRS_o}{10^6 mg/kg}\right) + \left(\frac{1}{RfD_o} \cdot \frac{SA_{aw} \cdot AF_{aw} \cdot ABS}{10^6 mg/kg}\right) + \left(\frac{1}{RfD_i} \cdot \frac{IRA_a}{VF_s}\right)\right]}$$

Under guidelines discussed in EPA (2002), the following equations were used to develop RBCs for water. The residential water equations are based on two exposure routes (ingestion and inhalation). The industrial water equations are only based on the ingestion exposure route.

RBC for Ingestion and Inhalation Exposures to Carcinogenic Contaminants in Residential Tap Water

$$C(ug/L) = \frac{TR \cdot AT_c \cdot 10^3 ug/mg}{EF_r\left[\left(IFW_{adj} \cdot CSF_o\right) + \left(VF_w \cdot InhF_{adj} \cdot CSF_i\right)\right]}$$

RBC for Ingestion and Inhalation Exposures to Noncarcinogenic Contaminants in Residential Tap Water

$$C(ug/L) = \frac{THQ \cdot BW_a \cdot AT_n \cdot 10^3 ug/mg}{EF_r \cdot ED_r\left[\left(\frac{IRW_a}{RfD_o}\right) + \left(\frac{VF_w \cdot IRA_a}{RfD_i}\right)\right]}$$

RBC for Ingestion Exposure to Carcinogenic Contaminants in Industrial Tap Water

$$C(ug/L) = \frac{TR \cdot AT_c \cdot 10^3 ug/mg}{EF_o\left(IFW_{adj} \cdot CSF_o\right)}$$

RBC for Ingestion Exposure to Noncarcinogenic Contaminants in Industrial Tap Water

$$C(ug/L) = \frac{TR \cdot AT_n \cdot 10^3 ug/mg}{EF_o \cdot ED_o\left(\frac{IRW_a}{RfD_o}\right)}$$

Where:

Symbol	Definition	Default
CSFo	Cancer slope factor oral (mg/kg-day)	chem - spec
CSFi	Cancer slope factor inhaled (mg/kg-day)	chem - spec
RfDo	Reference dose oral (mg/kg-day)	chem - spec
RfDi	Reference dose inhaled (mg/kg-day)	chem - spec
TR	Target cancer risk	10^{-6}
THQ	Target hazard quotient	1
BWa	Body weight, adult (kg)	70
BWc	Body weight, child (kg)	15
ATc	Averaging time - carcinogens(days)	25550
ATn	Averaging time - non-carcinogens (days)	ED*365

Symbol	Definition	Default
SAa	Exposed surface area for soil/dust (cm^2/day)	
	- adult resident	5700
	- adult worker	3300
SAc	Exposed surface area, child in soil (cm^2/day)	2800
AFa	Adherence factor, soils (mg/cm^2)	
	- adult resident	0.07
	- adult worker	0.2
AFc	Adherence factor, child	0.2
ABS	Skin absorption defaults (unitless)	
	- semi-volatile organics	0.1
IRAa	Inhalation rate – adult (m^3/day)	20
IRAc	Inhalation rate – child (m^3/day)	10
IRWa	Drinking water ingestion – adult (L/day)	2
IRWc	Drinking water ingestion – child (L/day)	1
IRSa	Soil ingestion – adult (mg/day)	100
IRSc	Soil ingestion – child (mg/day)	200
IRSo	Soil ingestion – occupational (mg/day)	100
EFr	Exposure frequency – residential (d/y)	350
EFo	Exposure frequency – occupational (d/y)	250
EDr	Exposure duration – residential (years)	30
EDc	Exposure duration – child (years)	6
EDo	Exposure duration – occupational (years)	25
IFSadj	Ingestion factor, soils (mg-yr/kg-d)	114
SFSadj	Dermal factor, soils (mg-yr/kg-d)	361
InhFadj	Inhalation factor, air (m^3-yr/kg-d)	11
IFWadj	Ingestion factor, water (L-yr/kg-d)	1.1
VFw	Volatilization factor for water (L/m^3)	0.5

References

California Environmental Protection Agency. 1994. Preliminary Endangerment Assessment. Department of Toxic Substances Control. Sacramento, CA: California Environmental Protection Agency.

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WATER SUMMARY TABLE

Chemical	Water Standard (ug/L)	Source (1)
Volatile Organic Chemicals		
Benzene	1	CA-MCL
Carbon Tetrachloride	0.5	CA-MCL
1,2-DCA	0.5	CA-MCL
cis-1,2-DCE	6	CA-MCL
trans-1,2-DCE	10	CA-MCL
Ethylbenzene	300	CA-MCL
Methyl tert-butyl ether	13	CA-MCL
Naphthalene	6.2	RBC
Tetrachloroethylene (PCE)	5	MCL
Tetraethyl Lead	0.0037	RBC
Toluene	150	CA-MCL
1,1,1-Trichloroethane (1,1,1-TCA)	200	MCL
Trichloroethylene (TCE)	5	MCL
Vinyl Chloride	0.5	CA-MCL
Xylene	1,750	CA-MCL
Nonvolatile Neutral Organic Compounds		
Aldrin	1.095	RBC
Benzo(a)pyrene	0.2	MCL
Chlordane	0.1	CA-MCL
DDD (Dichlorodiphenyldichloroethane)	0.277	RBC
DDE (Dichlorodiphenyldichloroethylene)	0.195	RBC
DDT(Dichlorodiphenyltrichloroethane)	0.195	RBC
Dieldrin	0.0041	RBC
1,4 Dioxane	6.03	RBC
Dioxin (2,3,7,8-TCDD)	3.00E-05	MCL
Endrin	2	MCL
Heptachlor	0.01	CA-MCL
Kepone	0.0083	RBC
Lindane (gamma-hexachlorocyclohexane)	0.2	MCL
Methoxychlor	30	CA-MCL
Mirex	0.0369	RBC
Polychlorinated Biphenyls (PCBs)	0.5	MCL
Toxaphene	3	MCL
Nonvolatile Acidic Organic Compounds		
Pentachlorophenol	1	MCL
2,4-Dichlorophenoxyacetic acid	70	MCL
2,4,5-Trichlorophenoxypropionic	50	MCL
Nonvolatile Inorganic Compounds		
Antimony	6	MCL
Arsenic	10	MCL
Asbestos	7E6 fibers/L	MCL
Barium	1,000	CA-MCL
Beryllium	4	MCL
Cadmium	5	MCL

Chemical	Water Standard (ug/L)	Source (1)
Chromium VI	50	CA-MCL
Chromium III	50	CA-MCL
Cobalt	730	RBC
Copper	1,300	MCL
Fluoride Salts	1,400	CA-MCL
Lead	15	MCL
Mercury	2	MCL
Molybdenum	183	RBC
Nickel	1.0E+02	CA-MCL
Perchlorate	3.65	RBC
Selenium	50	MCL
Silver	100	SMCL
Thallium	2	MCL
Vanadium and compounds	256	RBC
Zinc	5,000	SMCL

NOTES:
(1) MCL values (CA-MCL, MCL, and SMCL) represent concentrations that may not be exceeded at the tap.
CA-MCL = California MCL
MCL = federal MCL
RBC = risk-based concentration
SMCL = secondary MCL

SOIL SUMMARY

Chemicals	RBC Residential–Soil (mg/kg)	Residential Basis (7)	RBC Industrial–Soil (mg/kg)	Industrial Basis (7)
Volatile Organic Chemicals (1)				
Benzene	5.8E-01	ca	1.3E+00	ca
Carbon Tetrachloride	2.5E-01	ca	5.5E-01	ca
1,2-DCA	2.7E-01	ca	5.9E-01	ca
cis-1,2-DCE	4.3E+01	nc	1.4E+02	nc
trans-1,2-DCE	6.8E+01	nc	2.3E+02	nc
Ethylbenzene	8.7E+00	ca	1.9E+01	ca
Methyl tert-butyl ether	1.6E+01	ca	3.6E+01	ca
Naphthalene	5.5E+01	nc (8)	1.9E+02	nc (8)
Tetrachloroethylene (PCE)	1.5E+00	ca	3.3E+00	ca
Tetraethyl Lead	7.1E-03	nc	6.2E-02	nc
Toluene	6.6E+02	nc	2.2E+03	nc
1,1,1-Trichloroethane (1,1,1-TCA)	2.0E+03	nc	6.8E+03	nc
Trichloroethylene (TCE)	5.2E-02	ca	1.1E-01	ca
Vinyl Chloride	1.3E-01	ca	3.3E-01	ca
Xylene	2.8E+02	nc	9.0E+02	nc
Nonvolatile Neutral Organic Compounds				
Aldrin	3.3E-02	ca	1.3E-01	ca
Benzo(a)pyrene	5.9E-02	ca	2.0E-01	ca
Chlordane	1.6E+00	ca	6.1E+00	ca
DDD (Dichlorodiphenyldichloroethane)	2.3E+00	ca	9.0E+00	ca
DDE (Dichlorodiphenyldichloroethylene)	1.6E+00	ca	6.3E+00	ca
DDT(Dichlorodiphenyltrichloroethane)	1.6E+00	ca	6.3E+00	ca
Dieldrin	3.5E-02	ca	1.3E-01	ca
1,4 Dioxane	5.0E+01	ca	2.0E+02	ca
Dioxin (2,3,7,8-TCDD)	3.9E-06	ca	1.6E-05	ca
Endrin	2.2E+01	nc	2.3E+02	nc
Heptachlor	1.2E-01	ca	4.8E-01	ca
Kepone	6.9E-02	ca	2.7E-01	ca
Lindane (gamma-hexachlorocyclohexane)	4.3E-01	ca	1.7E+00	ca
Methoxychlor	3.7E+02	nc	3.8E+03	nc
Mirex	3.1E-01	ca	1.2E+00	ca
Polychlorinated Biphenyls (PCBs)	2.2E-01	ca	7.2E-01	ca
Toxaphene	5.0E-01	ca	2.0E+00	ca
Nonvolatile Acidic Organic Compounds				
Pentachlorophenol	3.0E+00	ca	9.0E+00	ca
2,4-Dichlorophenoxyacetic acid	7.1E+02	nc	6.2E+03	nc
2,4,5-Trichlorophenoxypropionic	5.7E+02	nc	4.9E+03	nc
Nonvolatile Inorganic Compounds				
Antimony	3.1E+01	nc	3.8E+02	nc
Arsenic	12 (3)	NA	1.6E+00	ca
Asbestos	NA	NA	NA	NA
Barium	5.4E+03	nc	6.7E+04	nc

Chemicals	RBC Residential–Soil (mg/kg)	Residential Basis (7)	RBC Industrial–Soil (mg/kg)	Industrial Basis (7)
Beryllium	1.5E+02	nc	1.9E+03	nc
Cadmium	3.9E+01	nc	5.1E+02	nc
Chromium VI	38 (4)	NA	2.9E+03	nc
Chromium III	2,500 (5)	NA	1.4E+06	nc
Cobalt	1.5E+03	nc	1.9E+04	nc
Copper	2,500 (5)	NA	3.8E+04	nc
Fluoride Salts (2)	4.6E+03	nc	5.8E+04	nc
Lead	150 (6)	NA	750 (6)	NA
Mercury	20 (5)	NA	2.9E+02	nc
Molybdenum	3.9E+02	nc	4.8E+03	nc
Nickel	1.5E+03	nc	1.9E+04	nc
Perchlorate	7.7E+00	nc	9.6E+01	nc
Selenium	100 (5)	NA	4.8E+03	nc
Silver	3.9E+02	nc	4.8E+03	nc
Thallium	5.1E+00	nc	6.3E+01	nc
Vanadium	5.4E+02	nc	6.7E+03	nc
Zinc	5,000 (5)	NA	2.9E+05	nc

NOTES:

(1) Target concentrations for volatile organic compounds do not incorporate inhalation of vapors. The vapor inhalation pathway should be evaluated using an appropriate vapor migration model, e.g., the Johnson and Ettinger model, or other appropriate methodology.

(2) Evaluated as fluoride.

(3) Based on natural background concentration of arsenic in California, personal communication, Thomas F. Booze, PhD, DTSC.

(4) Based on inhalation of fugitive dust per U.S. EPA Region 9 PRG Background Document (October 1, 2002).

(5) Value presented is TTLC; risk-based concentration is greater than TTLC.

(6) Residential lead target concentration based on DTSC leadspread model (version 7). Residential RBC includes consumption of homegrown produce. Industrial target concentration based on EPA Adult Lead Model.

(7) Basis indicates whether target concentration is based on cancer (ca) or noncancerous (nc) effects.

(8) Naphthalene has recently been classified as a carcinogen by the State of California. The target concentration for naphthalene may, therefore, be revised once OEHHA publishes a cancer toxicity value (unit risk or cancer slope factor).